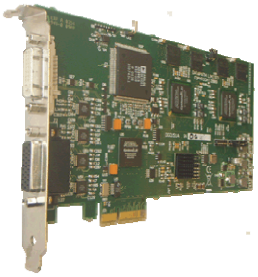
# EMS User Manual

## The XtremeRGB Range of Video Capture Cards

XtremeRGB-Ex1

XtremeRGB-Ex2

XtremeRGB-II



XtremeRGB-Ex4+

XtremeRGB-Ex8


### Electronic Modular Solutions Limited

Kendal House, 20 Blaby Road, S. Wigston,
Leics., LE18 4SB, England
Tel: +44 (0) 116 2775730
Fax: +44 (0) 116 2774973
Email: sales@ems-imaging.com
Web: www.ems-imaging.com


10 Nov 2009

# Contents

Chapter 1
Safety Instructions ..... 3
Chapter 2
Introduction ..... 4
Chapter 3
XtremeRGB-Ex1 ..... 5
Chapter 4
XtremeRGB-Ex2 ..... 14
Chapter 5
XtremeRGB-II ..... 22
Chapter 6
XtremeRGB-Ex8 ..... 32
Chapter 7
XtremeRGB-Ex4+ ..... 40
Chapter 8
EMS Limited ..... 51
Chapter 9
Index ..... 53

# Chapter 1

# Safety Instructions

To prevent damage to your EMS product or injury to personnel operating the equipment, please read the following safety precautions prior to operation. These instructions should be made available to all those who will use and operate EMS products.

## Power Supply

All EMS products require a mains power supply. This power supply must be disconnected when equipment is being upgraded or relocated.

## Cables

Do not expose cables to any liquids; doing so may cause a short circuit which could damage the equipment. Do not place heavy objects on top of any cables as this can cause damage and possibly lead to exposed live wires.

## Ventilation

All computer equipment should be located in a well ventilated area. All ventilation holes on the computer casing must be kept clear of any obstruction at all times. Failure to do so will result in the system over heating and damaging your equipment.

## Working Environment

The equipment should be located in an environment free from dust, moisture and extreme changes in temperature and should be placed on a stable and solid work surface. Liquids (hot/cold drinks etc) should not be placed near the equipment as spillage could cause serious damage.

## Gas/Flammable Liquids

Electronic equipment should never be used in the presence of gas or any flammable liquid, doing so could result in an explosion or serious fire.

## Smoke/Unusual Smells

Should you notice smoke or unusual smells being emitted from your computer, turn off and unplug the system from the mains supply. The system should then be passed to a qualified technician for inspection. Continued operation could result in personal injury and damage to property.

## Maintenance

Maintenance should only be carried out by competent technicians, any EMS plug-in cards that are physically damaged should be returned to EMS for repair using EMS RMA procedures.

## Disposal

At the end of life all EMS products should be disposed of as per local laws and regulations dictate. In UK contact EMS to arrange disposal. Our WEE registration number is WEE/AA0005ZR.

# Chapter 2

# Introduction

The EMS XtremeRGB range of video capture cards HD, HDMI, VGA/ RGB or DVI video sources in real time enabling you to view data from PCs, MACs, industrial / medical equipment, cameras and other video equipment. The XtremeRGB-Ex8 and XtremeRGB-Ex4+ captures PAL, SECAM and NTSC in both composite and S-Video.

The Windows® software provided with the cards allows the signal to be captured and displayed on your desktop or recorded and saved to your hard drive.

Windows Media Encoder® may also be used to stream video across a network or save the video to disk. Windows Media Player® can be used to display the stream or the video that has previously been saved.

Using our SDK, you can produce or customise your own application programs.

# Chapter 3

# XtremeRGB-Ex1

## FCC Compliance XtremeRGB-Ex1

Federal Communications Commission Statement

This device complies with FCC Rules Part 15. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial, industrial or business environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the manufacturers instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Re-orient or relocate the receiving antenna
- Increase the separation between the equipment and the receiver
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

**Warning! Any changes or modifications to this product not expressly approved by the manufacturer could void any assurances of safety or performance and could result in violation of Part 15 of the FCC Rules**.

Reprinted from the Code of Federal Regulations #47, part 15.193.1993. Washington DC: Office of the Federal Register, National Archives and Records Administration, US Government Printing Office.

| | Toxic or Hazardous Substances and Elements 有毒有害物质或元素 | | | | | |
|---|---|---|---|---|---|---|
| | 铅 (Pb) | 汞 (Hg) | 镉 (Cd) | 六价铬 (Cr(VI)) | 多溴联苯 (PBB) | 多溴二苯醚 (PBDE) |
| Contents 读装基板 | × | ○ | ○ | ○ | ○ | ○ |

备注（○ 或 × 的表示意思）
○：表示该有毒有害物质在该部件所有均质材料中的含量均在 SJ/T11363-2006 标准规定的限量要求以下。
×：表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T11363-2006 标准规定的限量要求。

# DECLARATION OF CONFORMITY

Per FCC Part 2 Section 2. 1077(a)

| | |
|---|---|
| **Responsible Party Name:** | EMS Limited |
| **Address:** | Leicester, England |
| **Phone:** | +44116-2775730 |

Hereby declares the product:

| | |
|---|---|
| **Product Name:** | RGB Video Capture PCIe Card |
| **Model Number:** | XtremeRGB-Ex1 |

Conforms to the following specifications:

| | |
|---|---|
| FCC Part 15 Subpart b | Class A Digital Device |

Supplementary Information:

This device has been shown to be in compliance with and was tested in accordance with the measurement procedures specified in the Standards & Specifications listed above and as indicated in the measurement report number: 7G0507GUS3

Representative Persons Name: Tony Jones, Operations Director

Signature: Date: 22 May 2008

## Introduction – XtremeRGB-Ex1

The XtremeRGB-Ex1 a single channel PCIe capture card can capture:

- Component HD up to 1080P at 60 frames per second (*Requires optional Component HD-DVI adapter*)
- HDMI up to 1080P (*Requires optional Component HD-DVI adapter, Audio not supported, HDCP not supported)*
- DVI up to 1920 x 1200
- RGB/VGA up to 2048 x 1536

The data is stored in a 32MB frame buffer on the card in real time. The data is transferred using PCI bus master DMA with scatter gather.

The data can be transferred to system memory or to off-screen memory on a EMS graphics card.

## Models

XtremeRGB-Ex1 - A single channel PCIe x4 low profile capture card.

## Specification

| | |
|---|---|
| • Board Format | PCIe x4 low profile card, 68.9mm x 167.6mm<br>PCIe bus master with scatter gather DMA providing maximum data rate of 480MB/s |
| • Connectors | One DVI-I Type connector |
| • Maximum Sample Rate: | 170 Mpixels per second analog RGB or 165MHz DVI |
| • Video Sampling: | Analog RGB: 24 bits per pixel / 8-8-8 format |
| • Video Capture Memory: | 32MB per channel (updated in real time). Triple buffered |
| • Analog RGB Mode Support: | 640 x 480, 800 x 600, 1024 x 768, 1280 x 1024, 1600 x 1200, 1920 x 1080, 2048 x 1536, Custom modes |
| • DVI Single Link Mode Support: | 640 x 480, 800 x 600, 1024 x 768, 1280 x 1024, 1600 x 1200, 1920 x 1080, 1920 x 1200 and Custom modes |
| • HD Modes | 1080p, 1080i, 720p, 567p, 480p and 480i using a Component HD connector (HDCP not supported) |
| • Input Mode Detection: | Automatic detection of input modes in hardware enabling the tracking of mode changes in the source signal |
| • Pixel Transfer Formats: | RGB: 5-5-5, 5-6-5 or 8-8-8 pixels<br>YUV 4:2:2 modes: UYVY, YUY2 or YVYU<br>MONO: 8bit |
| • Update Rate: | User defined, captured frame rate will match the source providing max data rate (480MB/s) is not exceeded.<br>Triple buffered to eliminate tearing artifacts |
| • Video Format Options: | Analog RGB plus HSync and VSync (5 wire)<br>Analog RGB with Composite Sync (4 wire)<br>Analog RGB with Sync on Green (3 wire)<br>DVI Single Link |
| • Operating System Support | Windows® XP, Windows® Vista, Windows® Server 2003, Windows® Server 2008 and Windows® 7 (x86 and x64 Operating Systems) |
| • Power Requirements | Max current at +3.3V – 0.25A<br>Max current at +12V – 0.5A<br>Max power – 6.8 Watts |
| • Operating Temperature: | 0 to 35 deg C |
| • Storage Temperature: | -20 to 70 deg C. |
| • Relative Humidity | 5% to 90% non-condensing |
| • Analog Input Range: | Min 0.5Vpp Max 1.0Vpp |
| • Input Offset: | +/-2V |
| • Hsync: | 15kHz - 110kHz |
| • Vsync: | No hardware limits, typically 25Hz - 200Hz for real signals |

| | |
|---|---|
| • Separate Sync Polarity: | Positive or Negative. (Separate H & V sync, Composite Sync) |
| • Sync On Green Polarity: | Negative |
| • Inputs: | 75 Ohm terminated |

## Unpacking

Your packing box should contain the following items:

- 1 x DVI to VGA Adapter
- 1 x low profile card bracket
- Installation CD ROM

If there are any discrepancies, you should contact EMS immediately.

**Note:**

**All plug-in cards are static sensitive and are packed in anti-static material. Please keep the card in its packaging until you are ready to install.**

**It is recommended that you do not discard the packing box until you are completely satisfied with the XtremeRGB-Ex1 capture card and it is fully installed and working correctly. We also recommend that you make a note of the serial number of the card in a prominent place before the card is plugged into the computer. This should hasten any query should you need to contact our Technical Support Department. The serial number is displayed on the card itself and the box label.**

## Installing the Capture Card

You are likely to need a flat blade and a Phillips head screwdriver for the installation of the capture card; it would be useful to have these to hand before you begin.

Installing the card is a simple process, follow the steps below to be up and running in a few minutes:

- Power down the PC (including peripherals), switch off at the mains and disconnect all the cables connected to the computer, noting the positions for accurate reconnection. Remove the PC cover
- Locate a vacant PCIe **(x4 or above)** slot for the XtremeRGB-Ex1 on the motherboard and remove the backing plate (retain all screws). **If in doubt consult your motherboard documentation to correctly identify a PCIe (PCI-express) slot. If the card is forced into a 32 or 64 bit PCI or PCI-X slot it will be irreparably damaged when the system is powered up and the warranty will be void**.
- Remove the card from its packaging and secure it firmly into the empty PCIe slot**. Extreme care should be taken when securing the card into the slot as some motherboards may have components that impede the siting of the card**
- Screw the card bracket to the back panel of the PC and replace the cover
- Re-connect all cables to the PC
- Connect the cable(s) distributing the RGB/DVI signals to the connectors on the XtremeRGB card located on the back panel.
- Power up the PC and commence the software installation.

### Connections

The XtremeRGB-Ex1 has one DVI-I type connector.

The card is connected using:

- DVI-D Cable
- DVI-A Cable
- Analog VGA (RGB) cable (adapter supplied)
- HDMI cable (adapter supplied as optional)
- Component HD cable (adapter supplied as optional)

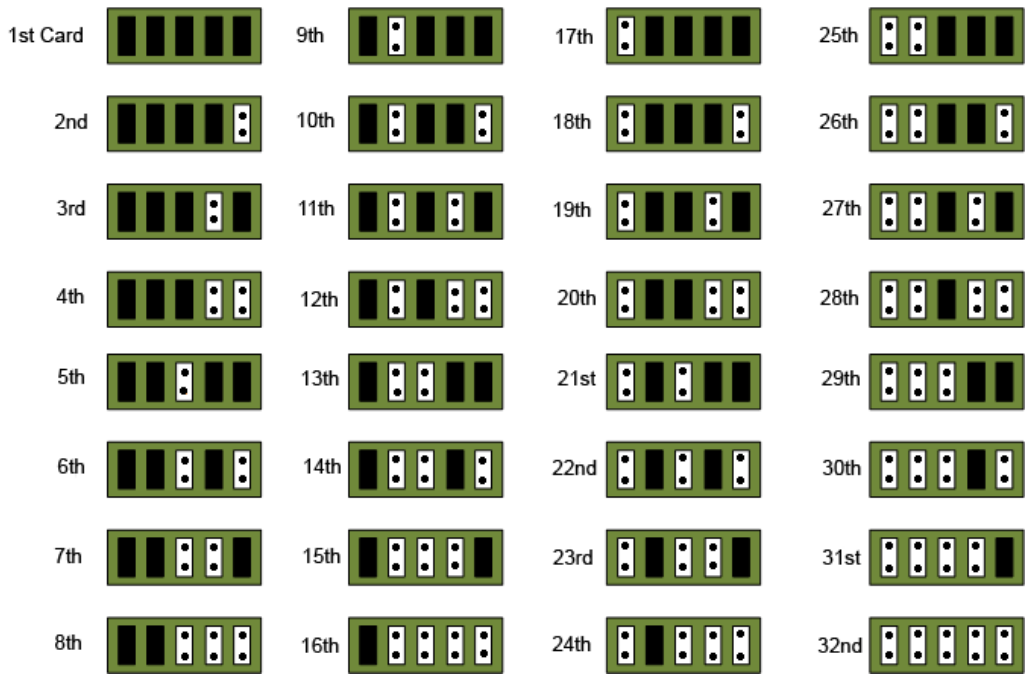
Connect one end of the cable to the source. Connect the other end of the cable to DVI-I type connector located on the XtremeRGB-Ex1 card in your computer.

DVI to VGA adapters are supplied for use with an analog VGA (RGB) Cable.

## Installing Multiple Cards

Up to 32 cards can be installed in a system providing a maximum of 32 capture channels. Combinations of all XtremeRGB capture cards in the same machine are supported by the driver.

In order to control the order in which the driver uses the cards, it is recommended when installing multiple cards that the J5 links on the XtremeRGB-Ex1 are configured. Each card should be configured as follows:




### DirectShow

If you change the link ordering after installation you must run dplinks.exe. This program will update the existing input names used by the windows DirectShow interface.

To run the dplinks program open the **Run** by clicking on **Start/Run** and type `dplinks` and then press Enter.

The program will run, however no notifications are displayed.

## Firmware Upgrades

The XtremeRGB-Ex1 cards allow firmware upgrade to be completed on site rather than returning the card to EMS. Whenever a firmware upgrade is performed, **LK4 MUST BE FITTED on the XtremeRGB-Ex1**. To perform the upgrade, follow the step-by-step instructions provided by the upgrade application.

In the unlikely event that something goes wrong during the upgrade process (e.g. System power outage) it is possible to revert to the factory settings by powering down the system, temporarily removing LK4 then powering up the system with the link removed. Once the system has rebooted, replace the LK4 link (whilst the system is powered up) and restart the firmware upgrade process.

It should be noted that the latest driver installation program includes an automatic firmware update, if required. Therefore, prior to installing the application and driver, ensure that LK1/ LK4 is fitted.

## Extended Display Identification Data (EDID) - Disable Links

EDID is data provided by a display monitor and sent to the graphics device detailing the monitor's capabilities thereby enabling a system to identify the type of monitor that is attached.

The graphics device installed on your machine will see the card as a monitor and will expect to receive the EDID data from the card.

However, in rare circumstances it may be necessary that the XtremeRGB-Ex1 does not report an EDID of any kind. In this instance EDID support can be disabled by removing link LK3 on the XtremeRGB-Ex1

## Software Installation

The XtremeRGB-DVI software (driver and application) is installed by inserting the CD that was shipped with your card into your CD ROM drive. The installation process should start automatically.

Should the CD fail to autorun use **Explorer** to browse the CD, locate then double click on **install.exe** file e.g. **d:/install.exe** and click on **Install Software…** and follow the installation wizard instructions as prompted.

Regular software updates are available from our website: www.ems-imaging.com

Also available on the EMS CD:

- The Release Notes - The release notes contain the latest information on the XtremeRGB-Ex1 including:
- Installation instructions.
- Release history
- Known problems
- Troubleshooting
- The application Help File - Instructions on how to use the application. The help file is in **CD:\XtremeRGB Manual\XtremeRGB_help.pdf**
- Test patterns to assist in setting up an analog RGB / DVI source (see help file topic *How to set up an* RGB / DVI *Source*)

## Application Overview

The application displays the source in a window; it has the following features:

- Scales the data to fit in the window

- Ability to set up sources accurately (settings automatically saved)
- Save a single frame to a file in one of the following formats:
  BMP, JPEG, GIF, TIFF, PNG
- Print a single frame
- Record and playback captured data using DirectShow
- Maintain the aspect ratio of the displayed data
- Cropping
- Display text over the data (on-screen display)
- Command line interface
- Help file documenting all features

**Note:**

**The supplied drivers and software require that you are using:**

- **Windows® XP, Windows® Vista, Windows® Server 2003, Windows® Server 2008 or Windows® 7 (x86 and x64 Operating Systems)**
- **CD / DVD ROM Drive**

## Using the card with other EMS products

The XtremeRGB-Ex1 captures the data and stores it in an on-board video buffer. This data is then copied using DMA to the host system for display, storage or streaming.

When a EMS graphics card is used, the XtremeRGB-Ex1 transfers the data directly to the graphics card thereby increasing performance. The XtremeRGB-Ex1 sends the relevant portions of each captured image to each display channel and instructs each channel to use its graphics engine to render the data. This fully utilises the hardware and dramatically increases performance.

When a Direct3D compatible graphics card is used the data can be transferred direct to the graphics card in a similar manner to the EMS graphics card with the added benefit of non-tearing captures.

When the data is displayed on a non EMS graphics card, the XtremeRGB-Ex1 sends the data to system memory or direct to the graphics card, dependant on the software used for display.

# Chapter 4

# XtremeRGB-Ex2

## FCC Compliance – XtremeRGB-Ex2

Federal Communications Commission Statement

This device complies with FCC Rules Part 15. Operation is subject to the following two conditions:

This device may not cause harmful interference, and

This device must accept any interference received, including interference that may cause undesired operation

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial, industrial or business environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the manufacturers instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Re-orient or relocate the receiving antenna

Increase the separation between the equipment and the receiver

Connect the equipment to an outlet on a circuit different from that to which the receiver is connected

Consult the dealer or an experienced radio/TV technician for help

**Warning! Any changes or modifications to this product not expressly approved by the manufacturer could void any assurances of safety or performance and could result in violation of Part 15 of the FCC Rules**.

Reprinted from the Code of Federal Regulations #47, part 15.193.1993. Washington DC: Office of the Federal Register, National Archives and Records Administration, US Government Printing Office.

| | Toxic or Hazardous Substances and Elements 有毒有害物质或元素 | | | | | |
|---|---|---|---|---|---|---|
| | 铅 (Pb) | 汞 (Hg) | 镉 (Cd) | 六价铬 (Cr(VI)) | 多溴联苯 (PBB) | 多溴二苯醚 (PBDE) |
| Contents 实装基板 | × | ○ | ○ | ○ | ○ | ○ |

备注（○ 或 × 的表示意思）
○：表示该有毒有害物质在该部件所有均质材料中的含量均在 SJ/T11363-2006 标准规定的限量要求以下。
×：表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T11363-2006 标准规定的限量要求。

# DECLARATION OF CONFORMITY

Per FCC Part 2 Section 2. 1077(a)

| | |
|---|---|
| **Responsible Party Name:** | EMS Limited |
| **Address:** | Leicester, England |
| **Phone:** | +44116-2775730 |

Hereby declares the product:

| | |
|---|---|
| **Product Name:** | RGB Video Capture PCIe Card |
| **Model Number:** | XtremeRGB-E2 |

Conforms to the following specifications:

| | |
|---|---|
| FCC Part 15 Subpart B | Class A Digital Device |

Supplementary Information:

This device has been shown to be in compliance with and was tested in accordance with the measurement procedures specified in the Standards & Specifications listed above and as indicated in the measurement report number: 7G0507GUS3

Representative Persons Name: Tony Jones, Operations Director

Signature: Date: 22 May 2008

## Introduction – XtremeRGB-Ex2

The XtremeRGB-Ex2, a dual channel PCIe capture card can capture:

- Component HD up to 1080P at 60 frames per second (*Requires optional Component HD-DVI adapter*)
- HDMI up to 1080P (*Requires optional Component HD-DVI adapter, Audio not supported, HDCP not supported)*
- DVI up to 1920 x 1200
- RGB/VGA up to 2048 x 1536

The data is stored in a 32MB frame buffer on the card in real time. The data is transferred using PCI bus master DMA with scatter gather.

The data can be transferred to system memory or to off-screen memory on a EMS graphics card.

## Models

XtremeRGB-Ex2 - A dual channel PCIe x4 low profile capture card.

## Specification

| | |
|---|---|
| • Board Format | PCIe half size plug-incard card, 110mm x 170mm<br>PCIe bus master with scatter gather DMA providing maximum data rate of 480MB/s |
| • Connectors | Two DVI-I Type connectors |
| • Maximum Sample Rate: | 170 Mpixels per second analog RGB or 165MHz DVI |
| • Video Sampling: | Analog RGB: 24 bits per pixel / 8-8-8 format |
| • Video Capture Memory: | 64MB (updated in real time). Triple buffered |
| • Analog RGB Mode Support: | 640 x 480, 800 x 600, 1024 x 768, 1280 x 1024, 1600 x 1200, 1920 x 1080, 2048 x 1536, Custom modes |
| • DVI Single Link Mode Support: | 640 x 480, 800 x 600, 1024 x 768, 1280 x 1024, 1600 x 1200, 1920 x 1080, 1920 x 1200, Custom modes |
| • HD Modes | 1080p, 1080i, 720p, 567p, 480p and 480i using a Component HD connector (HDCP not supported) |
| • Input Mode Detection: | Automatic detection of input modes in hardware enabling the tracking of mode changes in the source signal |
| • Pixel Transfer Formats: | RGB: 5-5-5, 5-6-5 or 8-8-8 pixels<br>YUV 4:2:2 modes: UYVY, YUY2 or YVYU<br>MONO: 8bit |
| • Update Rate: | User defined, captured frame rate will match the source providing max data rate (480MB/s) is not exceeded.<br>Triple buffered to eliminate tearing artifacts |
| • Video Format Options: | Analog RGB plus HSync and VSync (5 wire)<br>Analog RGB with Composite Sync (4 wire)<br>Analog RGB with Sync on Green (3 wire)<br>DVI Single Link |
| • Operating System Support | Windows® XP, Windows® Vista, Windows® Server 2003, Windows® Server 2008 and Windows® 7 (x86 and x64 Operating Systems) |
| • Power Requirements | Max current at +3.3V – 0.25A<br>Max current at +12V – 1.2A<br>Max power – 15 Watts |
| • Operating Temperature: | 0 to 35 deg C |
| • Storage Temperature: | -20 to 70 deg C. |
| • Relative Humidity | 5% to 90% non-condensing |
| • Analog Input Range: | Min 0.5Vpp Max 1.0Vpp |
| • Input Offset: | +/-2V |
| • Hsync: | 15kHz - 110kHz |
| • Vsync: | No hardware limits, typically 25Hz - 200Hz for real signals |

| | |
|---|---|
| • Separate Sync Polarity: | Positive or Negative. (Separate H & V sync, Composite Sync) |
| • Sync On Green Polarity: | Negative |
| • Inputs: | 75 Ohm terminated |

## Unpacking

Your packing box should contain the following items:

- The XtremeRGB-Ex2
- 2 x DVI to VGA Adapters
- Installation CD ROM

If there are any discrepancies, you should contact EMS immediately.

**Note:**

**All plug-in cards are static sensitive and are packed in anti-static material. Please keep the card in its packaging until you are ready to install.**

**It is recommended that you do not discard the packing box until you are completely satisfied with the XtremeRGB-Ex2 capture card and it is fully installed and working correctly. We also recommend that you make a note of the serial number of the card in a prominent place before the card is plugged into the computer. This should hasten any query should you need to contact our Technical Support Department. The serial number is displayed on the card itself and the box label.**

## Installing the Capture Card

You are likely to need a flat blade and a Phillips head screwdriver for the installation of the capture card; it would be useful to have these to hand before you begin.

Installing the card is a simple process, follow the steps below to be up and running in a few minutes:

- Power down the PC (including peripherals), switch off at the mains and disconnect all the cables connected to the computer, noting the positions for accurate reconnection. Remove the PC cover
- Locate a vacant PCIe **(x4 or above)** slot for the XtremeRGB-Ex2 on the motherboard and remove the backing plate (retain all screws) **If in doubt consult your motherboard documentation to correctly identify a PCIe (PCI-express) slot. If the card is forced into a 32 or 64 bit PCI or PCI-X slot it will be irreparably damaged when the system is powered up and the warranty will be void**.
- Remove the card from its packaging and secure it firmly into the empty PCIe slot**. Extreme care should be taken when securing the card into the slot as some motherboards may have components that impede the siting of the card**
- Screw the card bracket to the back panel of the PC and replace the cover
- Re-connect all cables to the PC
- Connect the cable(s) distributing the HD/HDMI/RGB/DVI signals to the connectors on the XtremeRGB-Ex2 card located on the back panel.
- Power up the PC and commence the software installation.

## Connections

The XtremeRGB-Ex2 card has two DVI-I type connectors for two separate, simultaneous inputs. The top connector is referred to as Channel 1, the bottom connector, Channel 2.

Connect to the source using:

- DVI-D Cable
- DVI-A Cable
- Analog VGA (RGB) cable (adapter supplied)
- HDMI cable (adapter supplied as optional)
- Component HD cable (adapter supplied as optional)

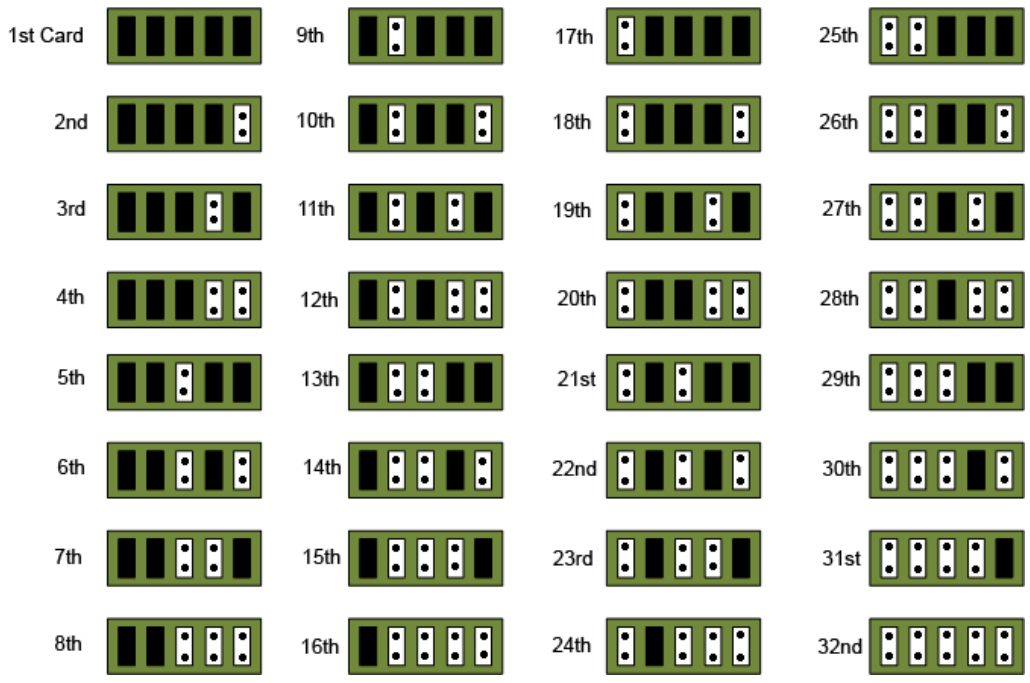
Connect one end of the cable to the source. Connect the other end of the cable to DVI-I type connector located on the XtremeRGB-Ex2 card in your computer.

DVI to VGA adapters are supplied for use with an analog VGA (RGB) Cable.

## Installing Multiple Cards

Up to 32 cards can be installed in a system providing a maximum of 64 capture channels using the XtremeRGB-Ex2. Combinations of XtremeRGB capture cards in the same machine are supported by the driver.

In order to control the order in which the driver uses the cards, it is recommended when installing multiple cards that the J5 links on the XtremeRGB-Ex2 are configured. Each card should be configured as follows:




### DirectShow

If you change the link ordering after installation you must run dplinks.exe. This program will update the existing input names used by the windows DirectShow interface.

To run the dplinks program open the **Run** by clicking on **Start/Run** and type `dplinks` and then press Enter.

The program will run, however no notifications are displayed.

## Firmware Upgrades

The XtremeRGB-Ex2 cards allow firmware upgrade to be completed on site rather than returning the card to EMS. Whenever a firmware upgrade is performed, **LK1 MUST BE FITTED on the XtremeRGB-Ex2**. To perform the upgrade, follow the step-by-step instructions provided by the upgrade application.

In the unlikely event that something goes wrong during the upgrade process (e.g. System power outage) it is possible to revert to the factory settings by powering down the system, temporarily removing LK1 then powering up the system with the link removed. Once the system has rebooted, replace the LK1 link (whilst the system is powered up) and restart the firmware upgrade process.

It should be noted that the latest driver installation program includes an automatic firmware update, if required. Therefore, prior to installing the application and driver, ensure that LK1 is fitted.

## Extended Display Identification Data (EDID) - Disable Links

EDID is data provided by a display monitor and sent to the graphics device detailing a monitors capabilities thereby enabling a system to identify the type of monitor that is attached.

The graphics device installed on your machine will see the card as a monitor and will expect to receive the EDID data from the card.

However, in rare circumstances it may be necessary that the XtremeRGB-Ex2 does not report an EDID of any kind. In this instance EDID support can be disabled by removing links LK2 or LK3.

Removing the LK2 link will disable the EDID function on Channel 1 and removing LK3 will disable the EDID function on Channel 2.

## Software Installation

The XtremeRGB software (driver and application) is installed by inserting the CD that was shipped with your card into your CD ROM drive. The installation process should start automatically.

Should the CD fail to autorun use **Explorer** to browse the CD, locate then double click on **install.exe** file e.g. **d:/install.exe** and click on **Install Software…** and follow the installation wizard instructions as prompted.

Regular software updates are available from our website: www.ems-imaging.com

Also available on the EMS CD:

- The Release Notes - The release notes contain the latest information on the XtremeRGB-Ex2
- Installation instructions.
- Release history
- Known problems
- Troubleshooting
- The application Help File - Instructions on how to use the application. The help file is in c**d:/XtemeRGB_manual/XtremeRGB_help.pdf**
- Test patterns to assist in setting up an analog RGB / DVI source (see help file topic *How to set up an* RGB / DVI *Source*)

## Application Overview

The application displays the analog RGB / DVI source in a window; it has the following features:

- Scales the analog RGB / DVI data to fit in the window
- Ability to set up analog RGB / DVI sources accurately (settings automatically saved)
- Save a single frame to a file in one of the following formats:
  BMP, JPEG, GIF, TIFF, PNG
- Print a single frame
- Record and playback captured data using XtremeRecoder and XtremePlayer
- Maintain the aspect ratio of the displayed RGB / DVI data
- Cropping
- Display text over the analog RGB / DVI data (on-screen display)
- Command line interface
- Help file documenting all features

**Note:**

**The supplied drivers and software require that you are using:**

- **Windows® XP, Windows® Vista, Windows® Server 2003, Windows® Server 2008 or Windows® 7 (x86 and x64 Operating Systems)**
- **CD / DVD ROM Drive**

## Using the card with other EMS products

The XtremeRGB-Ex2 captures the HD/HDMI/analog RGB/DVI data and stores it in an on-board video buffer. This data is then copied using DMA to the host system for display, storage or streaming.

When a EMS graphics card is used, XtremeRGB-Ex2 transfers the data directly to the graphics card thereby increasing performance. The XtremeRGB-Ex2 sends the relevant portions of each captured image to each display channel and instructs each channel to use its graphics engine to render the data. This fully utilises the hardware and dramatically increases performance.

When a Direct3D compatible graphics card is used the data can be transferred direct to the graphics card in a similar manner to the EMS graphics card with the added benefit of non-tearing captures.

When the RGB/DVI data is displayed on a non EMS graphics card, the XtremeRGB-Ex2 sends the data to system memory or direct to the graphics card, dependant on the software used for display.

# Chapter 5

# XtremeRGB-II

## FCC Compliance

Federal Communications Commission Statement

This device complies with FCC Rules Part 15. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial, industrial or business environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the manufacturers instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Re-orient or relocate the receiving antenna
- Increase the separation between the equipment and the receiver
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

**Warning! Any changes or modifications to this product not expressly approved by the manufacturer could void any assurances of safety or performance and could result in violation of Part 15 of the FCC Rules**.

Reprinted from the Code of Federal Regulations #47, part 15.193.1993. Washington DC: Office of the Federal Register, National Archives and Records Administration, US Government Printing Office.

| | Toxic or Hazardous Substances and Elements 有毒有害物质或元素 | | | | | |
|---|---|---|---|---|---|---|
| | 铅 (Pb) | 汞 (Hg) | 镉 (Cd) | 六价铬 (Cr(VI)) | 多溴联苯 (PBB) | 多溴二苯醚 (PBDE) |
| Contents 实装基板 | × | ○ | ○ | ○ | ○ | ○ |

备注（○ 或 × 的表示意思）
○：表示该有毒有害物质在该部件所有均质材料中的含量均在 SJ/T11363-2006 标准规定的限量要求以下。
×：表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T11363-2006 标准规定的限量要求。

# DECLARATION OF CONFORMITY

Per FCC Part 2 Section 2. 1077(a)

| | |
|---|---|
| **Responsible Party Name:** | EMS Limited |
| **Address:** | Leicester, England |
| **Phone:** | +44116-2775730 |

Hereby declares the product:

| | |
|---|---|
| **Product Name:** | RGB Video Capture PCI-X Card |
| **Model Number:** | XtremeRGB-II |

Conforms to the following specifications:

| | |
|---|---|
| FCC Part 15 Subpart B | Class B Digital Device |

Supplementary Information:

This device has been shown to be in compliance with and was tested in accordance with the measurement procedures specified in the Standards & Specifications listed above and as indicated in the measurement report number: 03U2396-1

Representative Persons Name: Tony Jones, Operations Director

Signature: Date: 17 January 2008

## Introduction

The XtremeRGB-II, a dual channel PCI-X capture card can capture:

- Component HD up to 1080P at 60 frames per second (*Requires optional Component HD-DVI adapter*)
- HDMI up to 1080P (*Requires optional Component HD-DVI adapter, Audio not supported, HDCP not supported)*
- DVI up to 1920 x 1200
- RGB/VGA up to 2048 x 1536

The data is stored in a 32MB frame buffer on the card in real time. The data is transferred using PCI bus master DMA with scatter gather.

The data can be transferred to system memory or to off-screen memory on a EMS graphics card.

## Models

XtremeRGB-II - A dual channel PCI-X capture card.

## Specification

| | |
|---|---|
| • Board Format | 64 bit, up to 66MHz PCI-X, half size plug-in card 105mm x 170mm.<br>PCI bus master with scatter gather DMA providing maximum data rate of 480MB/s |
| • Connectors | Two DVI-I Type connectors |
| • Maximum Sample Rate: | 170 Mpixels per second analog RGB or 165MHz DVI |
| • Video Sampling: | Analog RGB: 24 bits per pixel / 8-8-8 format |
| • Video Capture Memory: | 64MB (updated in real time). Triple buffered |
| • Analog RGB Mode Support: | 640 x 480, 800 x 600, 1024 x 768, 1280 x 1024, 1600 x 1200, 1920 x 1080, 2048 x 1536, Custom modes |
| • DVI Single Link Mode Support: | 640 x 480, 800 x 600, 1024 x 768, 1280 x 1024, 1600 x 1200, 1920 x 1080 Custom modes |
| • HD Modes | 1080p, 1080i, 720p, 567p, 480p and 480i using a Component HD connector (HDCP not supported) |
| • Input Mode Detection: | Automatic detection of input modes in hardware enabling the tracking of mode changes in the source signal |
| • Pixel Transfer Formats: | RGB: 5-5-5, 5-6-5 or 8-8-8 pixels<br>YUV 4:2:2 modes: UYVY, YUY2 or YVYU<br>MONO: 8bit |
| • Update Rate: | User defined, typically up to 60 frames per second, limited by available PCI-X or PCIe bandwidth<br>Triple buffered to eliminate tearing artifacts |
| • Video Format Options: | Analog RGB plus HSync and VSync (5 wire)<br>Analog RGB with Composite Sync (4 wire)<br>Analog RGB with Sync on Green (3 wire)<br>DVI Single Link |
| • Operating System Support | Windows® XP, Windows® Vista, Windows® Server 2003, Windows® Server 2008 and Windows® 7 **(**x86 and x64 Operating Systems) |
| • Power Requirements | Max current at +3.3V – 0.5A<br>Max current at +5V – 1.7A<br>Max power - 10 Watts |
| • Operating Temperature: | 0 to 35 deg C |
| • Storage Temperature: | -20 to 70 deg C. |
| • Relative Humidity | 5% to 90% non-condensing |
| • Analog Input Range: | Min 0.5Vpp Max 1.0Vpp |
| • Input Offset: | +/-2V |
| • Hsync: | 15kHz - 110kHz |

| | |
|---|---|
| • Vsync: | No hardware limits, typically 25Hz - 200Hz for real signals |
| • Separate Sync Polarity: | Positive or Negative. (Separate H & V sync, Composite Sync) |
| • Sync On Green Polarity: | Negative |
| • Inputs: | 75 Ohm terminated |

## Unpacking

Your packing box should contain the following items:

- The XtremeRGB-II
- 2 x DVI to VGA Adapters
- Installation CD ROM

If there are any discrepancies, you should contact EMS immediately.

**Note:**

**All plug-in cards are static sensitive and are packed in anti-static material. Please keep the card in its packaging until you are ready to install.**

**It is recommended that you do not discard the packing box until you are completely satisfied with the XtremeRGB-II capture card and it is fully installed and working correctly. We also recommend that you make a note of the serial number of the card in a prominent place before the card is plugged into the computer. This should hasten any query should you need to contact our Technical Support Department. The serial number is displayed on the card itself and the box label.**

## Installing the Capture Card

You are likely to need a flat blade and a Phillips head screwdriver for the installation of the capture card; it would be useful to have these to hand before you begin.

Installing the card is a simple process, follow the steps below to be up and running in a few minutes:

- Power down the PC (including peripherals), switch off at the mains and disconnect all the cables connected to the computer, noting the positions for accurate reconnection. Remove the PC cover
- Locate a vacant PCI-X slot for the XtremeRGB-II on the motherboard and remove the backing plate (retain all screws). **If in doubt consult your motherboard documentation to correctly identify a PCIe (PCI-express) slot. If the card is forced into a 32 or 64 bit PCI or PCI-X slot it will be irreparably damaged when the system is powered up and the warranty will be void**.
- Remove the card from its packaging and secure it firmly into the empty PCI-X slot**. Extreme care should be taken when securing the card into the slot as some motherboards may have components that impede the siting of the card**
- Screw the card bracket to the back panel of the PC and replace the cover
- Re-connect all cables to the PC
- Connect the cable(s) distributing the HD/HDMI/RGB/DVI signals to the connectors on the XtremeRGB card located on the back panel.
- Power up the PC and commence the software installation.

## Connections

The XtremeRGB-II has two DVI-I type connectors for two separate, simultaneous inputs. The top connector is referred to as Channel 1, the bottom connector, Channel 2.

Connect to the source using:

- DVI-D Cable
- DVI-A Cable
- Analog VGA (RGB) cable (adapter supplied)
- HDMI cable (adapter supplied as optional)
- Component HD cable (adapter supplied as optional)

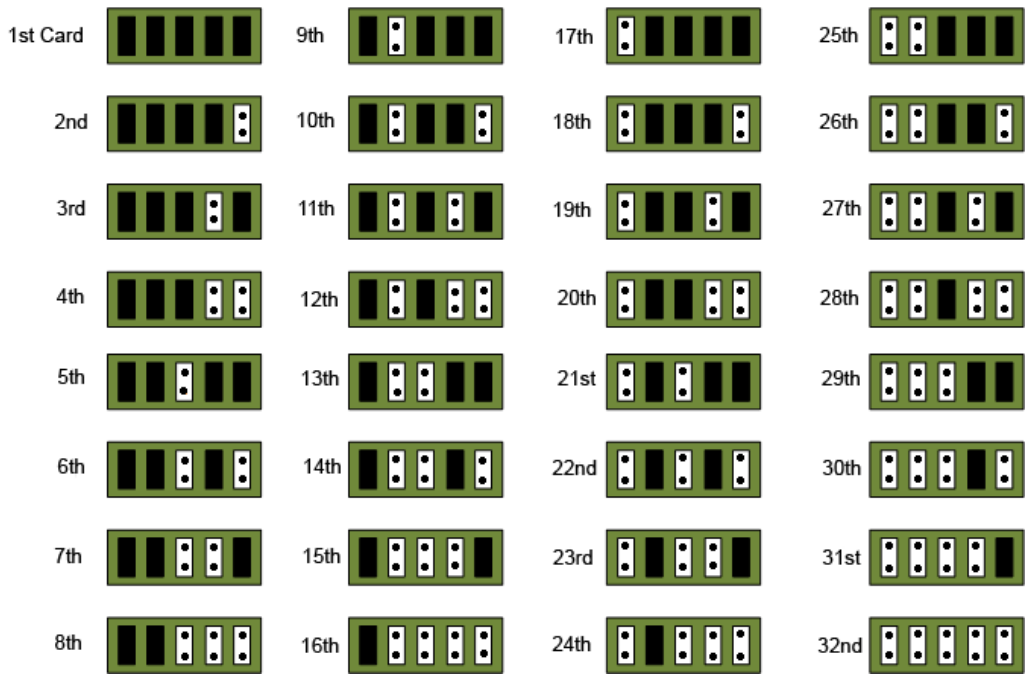
Connect one end of the cable to the source. Connect the other end of the cable to DVI-I type connector located on the XtremeRGB-II card in your computer.

DVI to VGA adapters are supplied for use with an analog VGA (RGB) Cable.

## Installing Multiple Cards

Up to 32 cards can be installed in a system providing a maximum of 64 capture channels using the XtremeRGB-II. Combinations of XtremeRGB capture cards in the same machine are supported by the driver.

In order to control the order in which the driver uses the cards, it is recommended when installing multiple cards that the J6 Links are configured. Each card should be configured as follows:




### DirectShow

If you change the link ordering after installation you must run dplinks.exe. This program will update the existing input names used by the windows DirectShow interface.

To run the dplinks program open the **Run** by clicking on **Start/Run** and type `dplinks` and then press Enter.

The program will run, however no notifications are displayed.

## Firmware Upgrades

The XtremeRGB-II card allow firmware upgrades to be completed on site rather than returning the card to EMS. Whenever a firmware upgrade is performed, **LK1 MUST BE FITTED on the XtremeRGB-II**. To perform the upgrade, follow the step-by-step instructions provided by the upgrade application.

In the unlikely event that something goes wrong during the upgrade process (e.g. System power outage) it is possible to revert to the factory settings by powering down the system, temporarily removing LK1 then powering up the system with the link removed. Once the system has rebooted, replace the LK1 link (whilst the system is powered up) and restart the firmware upgrade process.

It should be noted that the latest driver installation program includes an automatic firmware update, if required. Therefore, prior to installing the application and driver, ensure that LK1 is fitted.

## Extended Display Identification Data (EDID) - Disable Links

EDID is data provided by a display monitor and sent to the graphics device detailing monitors capabilities thereby enabling a system to identify the type of monitor that is attached.

The graphics device installed on your machine will see the card as a monitor and will expect to receive the EDID data from the card.

However, in rare circumstances it may be necessary that the XtremeRGB-II does not report an EDID of any kind. In this instance EDID support can be disabled by removing links LK2 or LK3.

Removing the LK2 link on the XtremeRGB-II card will disable the EDID function on Channel 1 and removing LK3 will disable the EDID function on Channel 2.

## Software Installation

The XtremeRGB software (driver and application) is installed by inserting the CD that was shipped with your card into your CD ROM drive. The installation process should start automatically.

Should the CD fail to autorun use **Explorer** to browse the CD, locate then double click on **install.exe** file e.g. **d:/install.exe** and click on **Install Software…** and follow the installation wizard instructions as prompted.

Regular software updates are available from our website: www.ems-imaging.com

Also available on the EMS CD:

- The Release Notes
- Installation instructions.
- Release history
- Known problems
- Troubleshooting
- The application Help File - Instructions on how to use the application. The help file is in **cd:/XtremeRGB Manual/XtremeRGB_help.pdf**
- Test patterns to assist in setting up an analog RGB / DVI source (see help file topic *How to set up an* RGB / DVI *Source*)

## Application Overview

The application displays the analog RGB / DVI source in a window; it has the following features:

- Scales the analog RGB / DVI data to fit in the window
- Ability to set up analog RGB / DVI sources accurately (settings automatically saved)
- Save a single frame to a file in one of the following formats:
  BMP, JPEG, GIF, TIFF, PNG
- Print a single frame
- Record and playback captured data using XtremeRecoder and XtremePlayer
- Maintain the aspect ratio of the displayed RGB / DVI data
- Cropping
- Display text over the analog RGB / DVI data (on-screen display)
- Command line interface
- Help file documenting all features

**Note:**

**The supplied drivers and software require that you are using:**

- **Windows® XP, Windows® Vista, Windows® Server 2003, Windows® Server 2008 or Windows® 7 (x86 and x64 Operating Systems)**
- **CD / DVD ROM Drive**

## Using the card with other EMS products

The XtremeRGB-II captures the HD/HDMI/ RGB/DVI data and stores it in an on-board video buffer. This data is then copied using DMA to the host system for display, storage or streaming.

When a EMS graphics card is used, the XtremeRGB-II transfers the data directly to the graphics card thereby increasing performance. The XtremeRGB-II sends the relevant portions of each captured image to each display channel and instructs each channel to use its graphics engine to render the data. This fully utilises the hardware and dramatically increases performance.

When a Direct3D compatible graphics card is used the data can be transferred direct to the graphics card in a similar manner to the EMS graphics card with the added benefit of non-tearing captures.

When the data is displayed on a non EMS graphics card, the XtremeRGB-II sends the data to system memory or direct to the graphics card, dependant on the software used for display.

# Chapter 6

# XtremeRGB-Ex8

## FCC Compliance

Federal Communications Commission Statement

This device complies with FCC Rules Part 15. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial, industrial or business environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the manufacturers instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Re-orient or relocate the receiving antenna
- Increase the separation between the equipment and the receiver
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

**Warning! Any changes or modifications to this product not expressly approved by the manufacturer could void any assurances of safety or performance and could result in violation of Part 15 of the FCC Rules**.

Reprinted from the Code of Federal Regulations #47, part 15.193.1993. Washington DC: Office of the Federal Register, National Archives and Records Administration, US Government Printing Office.

| | Toxic or Hazardous Substances and Elements 有毒有害物质或元素 | | | | | |
|---|---|---|---|---|---|---|
| | 铅 (Pb) | 汞 (Hg) | 镉 (Cd) | 六价铬 (Cr(VI)) | 多溴联苯 (PBB) | 多溴二苯醚 (PBDE) |
| Contents 实装基板 | × | ○ | ○ | ○ | ○ | ○ |

备注（○ 或 × 的表示意思）
○：表示该有毒有害物质在该部件所有均质材料中的含量均在 SJ/T11363-2006 标准规定的限量要求以下。
×：表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T11363-2006 标准规定的限量要求。

# DECLARATION OF CONFORMITY

Per FCC Part 2 Section 2. 1077(a)

| | |
|---|---|
| **Responsible Party Name:** | EMS Limited |
| **Address:** | Leicester, England, |
| **Phone:** | +44116-2775730 |

Hereby declares the product:

| | |
|---|---|
| **Product Name:** | SD Video Capture PCI-e x4 Card |
| **Model Number:** | XtremeRGB-Ex8 (DGC 144) |

Conforms to the following specifications:

| | |
|---|---|
| FCC Part 15 Subpart (b) | Class A Digital Device |

Supplementary Information:

This device has been shown to be in compliance with and was tested in accordance with the measurement procedures specified in the Standards & Specifications listed above and as indicated in the measurement report number: 9G2498GUS2

Representative Persons Name: Tony Jones, Operations Director

Signature: Date: 20 Aug

# Introduction – XtremeRGB-Ex8

The XtremeRGB-Ex8 is an eight channel PCI express video capture card. The card supports PAL, NTSC and SECAM in both composite and S-video input formats, supports de-interlaced video capture and allows display at 25/30 frames/sec for real-time video overlays.

The Windows® software provided with the card allows the analog video signal to be captured and displayed on your desktop.

Windows Media Encoder® may also be used to stream video across a network or save the video to disk. Windows Media Player® can be used to display the stream or the video that has previously been saved.

# Hardware Overview

The XtremeRGB-Ex8 is an eight channel PCIe capture card and can capture up to 8x 720x576x16bit from eight simultaneous capture channels for real time video overlays.

- Four Lane PCI express video capture card
- Eight simultaneous capture channels
- Support for any mix of  NTSC,PAL SECAM
- Eight composite/S-Video video inputs
- 32MB on board frame buffer
- Auto video mode and no-signal detection
- Daisy chain input to output with selectable termination
- High performance DMA with scatter gather
- Data Transfer at 480MB/s
- Supports up to 16 windows with any mix of input channels
- SDK available for OEM customers

### Models

XtremeRGB-Ex8

## Specification

| | |
|---|---|
| • Card Format : | 4 lane PCI express 110x170mm (approx) |
| • Connectors: | Two 26 Way D Connectors |
| • Maximum Capture Resolution: | 8x 720x576x16bit |
| • Frame Buffer Memory: | 64MB (updated in real time). |
| • Supported Video Formats: | PAL, NTSC and SECAM |
| • Operating System Support: | Windows® XP Professional (x86 and x64), Windows® Server 2003 (x86 and x64), Windows Vista® (x86 and x64), Windows® Server 2008 (x86 and x64) and Windows 7 |
| • Max Number of Cards per System: | 16 (128 capture channels) |
| • Max current at +3.3V: | 0.25A |
| • Max current at +12V: | 0.6A |
| • Operating Temperature: | 0 to 35 deg C |
| • Storage Temperature: | -20 to 70 deg C. |
| • Relative Humidity: | 5% to 90% non-condensing |
| • MTBF: | 100,000hrs |

## Unpacking

Your packing box should contain the following items:

- XtremeRGB-Ex8
- BNC16 Input Cable
- Installation CD ROM

If there are any discrepancies, you should contact EMS immediately.

**Note:**

**All plug-in cards are static sensitive and are packed in anti-static material. Please keep the card in its packaging until you are ready to install.**

**It is recommended that you do not discard the packing box until you are completely satisfied with the XtremeRGB-Ex8 video capture card and it is fully installed and working correctly. We also recommend that you make a note of the serial number of the card in a prominent place before the card is plugged into the computer. This should hasten any query should you need to contact our Technical Support Department. The serial number is displayed on the card itself and the box label.**

## Installing the XtremeRGB-Ex8 Capture Card

You are likely to need a flat blade and a Phillips head screwdriver for the installation of the capture card; it would be useful to have these to hand before you begin.

Installing the card is a simple process, follow the steps below to be up and running in a few minutes:

- Power down the PC (including peripherals), switch off at the mains and disconnect all the cables connected to the computer, noting the positions for accurate reconnection. Remove the PC cover
- Locate a vacant PCIe **(x4 or above)** slot on the motherboard and remove the backing plate. (retain all screws) **If in doubt consult your motherboard documentation to correctly identify a PCIe (PCI-express) slot. If the card is forced into a 32 or 64 bit PCI or PCI-X slot it will be irreparably damaged when the system is powered up and the warranty will be void**.
- Remove the card from its packaging and secure it firmly into the empty PCIe slot**. Extreme care should be taken when securing the card into the slot as some motherboards may have components that impede the siting of the card**
- Screw the card bracket to the back panel of the PC and replace the cover
- Re-connect all cables to the PC
- Connect the BNC16 Input cable
- Power up the PC and commence the software installation

## Connections

The XtremeRGB-Ex8 has two 26 Way D- type connectors. Either connector can be used to input video signals using a 16-way splitter cable (provided). The splitter cable consists of 16 BNC sockets numbered 1-16, connected to a 26-way D connector. To connect a video input, connect the Composite/S-Video Luma and Chroma as indicated in the table below.

| Input | Composite/S-Video Luma = BNC Connector | Chroma = BNC Connector |
|---|---|---|
| 1 | 1 | 9 |
| 2 | 2 | 10 |
| 3 | 3 | 11 |
| 4 | 4 | 12 |
| 5 | 5 | 13 |
| 6 | 6 | 14 |
| 7 | 7 | 15 |
| 8 | 8 | 16 |

## Video Passthrough

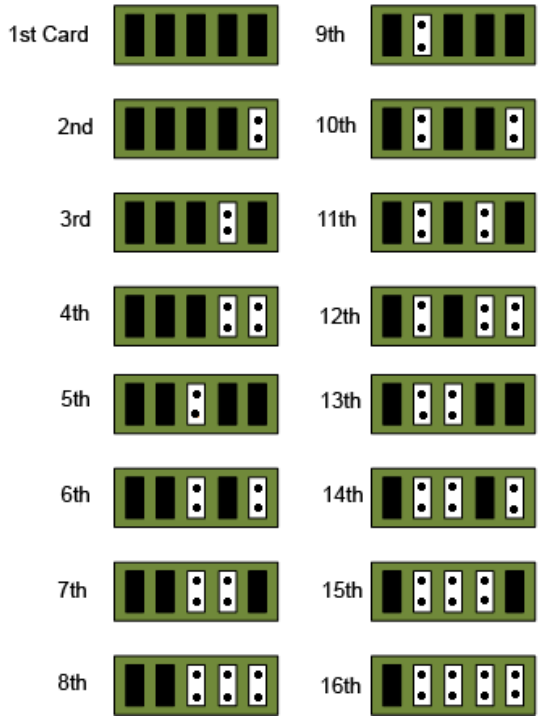
By connecting a second BNC16 Input Cable (available from EMS) to the second XtremeRGB-Ex8 connector it is possible to daisy-chain the video signals to another device. In this case the video will normally be terminated on the downstream device; therefore, the inbuilt terminations on the XtremeRGB-Ex8 should be disabled by removing the links as shown in the following table:

| Video Input | Termination Links |
|---|---|
| 1 | J2+J6 |
| 2 | J7+J9 |
| 3 | J12+J13 |
| 4 | J10+J11 |
| 5 | J14+J17 |
| 6 | J15+J16 |
| 7 | J18+J21 |
| 8 | J19+J20 |

## Installing Multiple Cards

Up to 16 cards can be installed in a system providing a maximum of 128 capture channels.

In order to control the order in which the driver uses the cards, it is recommended when installing multiple cards that the J5 links on the XtremeRGB-Ex8 are configured. Each card should be configured as follows:




### DirectShow

If you change the link ordering after installation you must run dplinks.exe. This program will update the existing input names used by the windows DirectShow interface.

To run the dplinks program open the **Run** by clicking on **Start/Run** and type `dplinks` and then press Enter.

The program will run, however no notifications are displayed.

## Firmware Upgrades

The XtremeRGB-Ex8 card allow firmware upgrade to be completed on site rather than returning the card to EMS. Whenever a firmware upgrade is performed, **LK4 MUST BE FITTED on the XtremeRGB-Ex8.** To perform the upgrade, follow the step-by-step instructions provided by the upgrade application.

In the unlikely event that something goes wrong during the upgrade process (e.g. System power outage) it is possible to revert to the factory settings by powering down the system, temporarily removing LK4 then powering up the system with the link removed. Once the system has rebooted, replace the LK4 link (whilst the system is powered up) and restart the firmware upgrade process.

It should be noted that the driver installation program (Version 01.07.00 and above) includes an automatic firmware update, if required. Therefore, prior to installing the application and driver, ensure that LK4 is fitted.

## Software Installation

The XtremeRGB software (driver and application) is installed by inserting the CD that was shipped with your card into your CD ROM drive. The installation process should start automatically.

Should the CD fail to autorun use **Explorer** to browse the CD, locate then double click on **install.exe** file e.g. **d:/install.exe** and click on **Install Software…** and follow the installation wizard instructions as prompted.

Regular software updates are available from our website: www.ems-imaging.com

Also available on the EMS CD:

- The Release Notes
- Installation instructions.
- Release history
- Known problems
- Troubleshooting
- The application Help File - Instructions on how to use the application. The help file is in **cd:/XtremeRGB Manual/XtremeRGB_help.pdf**

## Application Overview

The application displays the video source in a window; it has the following features:

- Scales the video data to fit in the window
- Save a single frame to a file in one of the following formats:
  BMP, JPEG, GIF, TIFF, PNG
- Print a single frame
- Record and playback captured data using DirectShow
- Maintain the aspect ratio of the displayed video data
- Cropping
- Display text over the video data (on-screen display)
- Command line interface
- Help file documenting all features

**Note:**

**The supplied drivers and software require that you are using:**

- **Windows® XP PRO/Server 2003/Server 2008, Windows®Vista or Windows® 7**
- **CD / DVD ROM Drive**

## Using the card with other EMS products

The XtremeRGB-Ex8 captures video data and stores it in an on-board video buffer. This data is then copied using bus master DMA to the host system for display, storage or streaming.

When a EMS graphics card is used, the XtremeRGB-Ex8 transfers the data directly to the graphics card thereby increasing performance. The XtremeRGB-Ex8 sends the relevant portions of each captured image to each display channel and instructs each channel to use its graphics engine to render the data. This fully utilises the hardware and dramatically increases performance.

When a Direct3D compatible graphics card is used the data can be transferred direct to the graphics card in a similar manner to the EMS graphics card with the added benefit of non-tearing captures.

When the video data is displayed on a non EMS graphics card, the XtremeRGB-Ex8 sends the data to system memory or direct to the graphics card, dependant on the software used for display.

# Chapter 7

# XtremeRGB-Ex4+

## FCC Compliance

Federal Communications Commission Statement

This device complies with FCC Rules Part 15. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial, industrial or business environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the manufacturers instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Re-orient or relocate the receiving antenna
- Increase the separation between the equipment and the receiver
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

**Warning! Any changes or modifications to this product not expressly approved by the manufacturer could void any assurances of safety or performance and could result in violation of Part 15 of the FCC Rules**.

Reprinted from the Code of Federal Regulations #47, part 15.193.1993. Washington DC: Office of the Federal Register, National Archives and Records Administration, US Government Printing Office.

| | Toxic or Hazardous Substances and Elements 有毒有害物质或元素 | | | | | |
|---|---|---|---|---|---|---|
| | 铅 (Pb) | 汞 (Hg) | 镉 (Cd) | 六价铬 (Cr(VI)) | 多溴联苯 (PBB) | 多溴二苯醚 (PBDE) |
| Contents 实装基板 | × | ○ | ○ | ○ | ○ | ○ |

备注（○ 或 × 的表示意思）
○：表示该有毒有害物质在该部件所有均质材料中的含量均在 SJ/T11363-2006 标准规定的限量要求以下。
×：表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T11363-2006 标准规定的限量要求。

# DECLARATION OF CONFORMITY

Per FCC Part 2 Section 2. 1077(a)

| | |
|---|---|
| **Responsible Party Name:** | EMS Limited |
| **Address:** | Leicester, England, |
| **Phone:** | +44116-2775730 |

Hereby declares the product:

| | |
|---|---|
| **Product Name:** | SD Video/RGB/DVI Capture PCI-e x4 Card |
| **Model Number:** | XtremeRGB-Ex4+ (DGC 151) |

Conforms to the following specifications:

| | |
|---|---|
| FCC Part 15 Subpart (b) | Class A Digital Device |

Supplementary Information:

This device has been shown to be in compliance with and was tested in accordance with the measurement procedures specified in the Standards & Specifications listed above and as indicated in the measurement report number: 9G2498GUS2

Representative Persons Name: Tony Jones, Operations Director

Signature: Date: 20 Aug

## Introduction – XtremeRGB-Ex4+

The XtremeRGB-Ex4+ is an ideal solution for applications that require the capture of up to four SD video sources and a single Component HD/HDMI/RGB/DVI source simultaneously. Typical applications include:

- Viewing Analog or DVI sources from PCs, MACs, Industrial/medical equipment, cameras and other video equipment
- Streaming video applications
- Video/Data Wall Controllers

The XtremeRGB-Ex4+ is a four channel PCI express video capture card. The card supports PAL, NTSC and SECAM in both composite and S-video input formats, supports de-interlaced video capture and displays at 25/30 frames/sec for real-time video vindows.

In addition, the XtremeRGB-Ex4+ is also a single channel PCIe capture card, able to capture:

- Component HD up to 1080P at 60 frames per second (*Requires optional Component HD-DVI adapter*)
- HDMI up to 1080P (*Requires optional Component HD-DVI adapter, Audio not supported, HDCP not supported)*
- DVI up to 1920 x 1200
- RGB/VGA up to 2048 x 1536

The data is stored in two 32MB frame buffers on the card in real time. The data is transferred using PCI bus master DMA with scatter gather. The data can be transferred to system memory, to off-screen memory on a EMS graphics card or via Direct 3D to third party graphics cards.

Windows Media Encoder® may also be used to stream video across a network or save the video to disk. Windows Media Player® can be used to display the stream or the video that has previously been saved.

## Hardware Overview

- Four channel SD Video and a single channel RGB/DVI/Component video capture card
- Four Lane PCIe interface with a maximum data rate of 480MB/sec
- Maximum analog RGB capture resolution of 2048 x 1536 x 24bit
- Maximum DVI capture resolution of 1920 x 1200 x 24bit
- HD modes (using a Component-DVI connector, HDCP not supported)
- Four SD capture channels for PAL/NTSC, SECAM (composite or S-Video inputs)
- On card processor for real time mode and sync detection
- Support for multiple cards allowing up to 32 SD capture channels and 8 DVI-I capture channels. (8 cards)
- Direct DMA driver software and streaming driver
- High quality down scaling
- Support for YUV 4:2:2, RGB 5:5:5, 5:6:5 and 8:8:8 video formats
- High performance DMA to system memory or direct to graphics memory with scatter gather
- Support for separate H/V sync, Composite sync or Sync on Green
- Support for Windows® XP/Vista/Server 2003/Server 2008/Windows 7

## Models

XtremeRGB-Ex4+

## Specification

| | |
|---|---|
| • Board Format: | PCI-e x4 plug-in card, 110mm x 204mm<br>PCI-e bus master with scatter gather DMA providing maximum data rate of 480MB/s |
| • Connectors: | One DVI-I type connector and one D-type connector for SD inputs |
| • Maximum Sample Rate: (RGB/DVI) | 170Mpixels per second analog RGB or 165 MHz DVI<br>Analog modes up to 340MHz pixel clock can be captured using dual-pass sampling |
| • Video Sampling: | RGB: 24 bits per pixel / 8-8-8 format<br>Video: 16bits per pixel/YUV format |
| • SD Maximum Capture Resolution: | 720x576x16bit |
| • Video Capture Memory: | 64 MB, triple buffered |
| • Analog RGB Mode Support: | 640x480, 800x600, 1024x768, 1280x1024, 1600x1200, 1920x1080, 2048x1536, custom modes. |
| • DVI Single Link Mode Support: | 640 x 480, 800 x 600, 1024 x 768, 1280 x 1024, 1600 x 1200, 1920x1080, 1900 x 1200, and custom modes. |
| • HD Modes | 1080p, 1080i, 720p, 576p, 576i, 480p and 480i using a Component HD-DVI Adapter (HDCP not supported). |
| • Input Mode Detection: | Automatic detection of input modes in hardware, enabling the tracking of mode changes in the source signal. |
| • Pixel Output Formats: | RGB: 5-5-5, 5-6-5 or 8-8-8 (24bit/32bit) pixels.<br>YUV: 4:2:2 |
| • Update Rate: | User defined, captured frame rate will match the source providing max data rate (480MB/s) is not exceeded.<br>Multi-buffered to eliminate tearing artifacts |
| • Video Format Options: | Analog RGB plus HSync and VSync (5 wire).<br>Analog RGB with Composite Sync (4 wire).<br>Analog RGB with Sync on Green (3 wire).<br>DVI Single Link.<br>PAL, NTSC, SECAM or S-Video for SD inputs |
| • Operating System Support | Windows® XP Professional (x32 and x64), Windows® Server 2003 (x32 and x64), Windows Vista® (x32 and x64), Windows® Server 2008 (x32 and x64) and Windows7® |

## Unpacking

Your packing box should contain the following items:

- XtremeRGB-Ex4+
- BNC16 Input Cable
- DVI-VGA Adapter
- Installation CD ROM

If there are any discrepancies, you should contact EMS immediately.

**Note:**

**All plug-in cards are static sensitive and are packed in anti-static material. Please keep the card in its packaging until you are ready to install.**

**It is recommended that you do not discard the packing box until you are completely satisfied with the XtremeRGB-Ex4+ video capture card and it is fully installed and working correctly. We also recommend that you make a note of the serial number of the card in a prominent place before the card is plugged into the computer. This should hasten any query should you need to contact our Technical Support Department. The serial number is displayed on the card itself and the box label.**

## Installing the XtremeRGB-Ex4+ Capture Card

You are likely to need a flat blade and a Phillips head screwdriver for the installation of the capture card; it would be useful to have these to hand before you begin.

Installing the card is a simple process, follow the steps below to be up and running in a few minutes:

- Power down the PC (including peripherals), switch off at the mains and disconnect all the cables connected to the computer, noting the positions for accurate reconnection. Remove the PC cover
- Locate a vacant PCIe **(x4 or above)** slot on the motherboard and remove the backing plate. (retain all screws) **If in doubt consult your motherboard documentation to correctly identify a PCIe (PCI-express) slot. If the card is forced into a 32 or 64 bit PCI or PCI-X slot it will be irreparably damaged when the system is powered up and the warranty will be void**.
- Remove the card from its packaging and secure it firmly into the empty PCIe slot**. Extreme care should be taken when securing the card into the slot as some motherboards may have components that impede the siting of the card**
- Screw the card bracket to the back panel of the PC and replace the cover
- Re-connect all cables to the PC
- Connect the BNC16 Input cable
- Power up the PC and commence the software installation

## Connections

The XtremeRGB-Ex4+ has two connectors. The top connector is a DVI-I connector and the bottom connector is a D-Type connector.

### The DVI-I Connector

Connect to the source using:

- DVI-D Cable
- DVI-A Cable
- Analog VGA (RGB) cable (adapter supplied)
- HDMI cable (adapter supplied as optional)
- Component HD cable (adapter supplied as optional)

Connect one end of the cable to the source. Connect the other end of the cable to DVI-I type connector (top connector) located on the XtremeRGB-Ex4+ card in your computer.

DVI to VGA adapters are supplied for use with an analog VGA (RGB) Cable.

## D-Type Connector

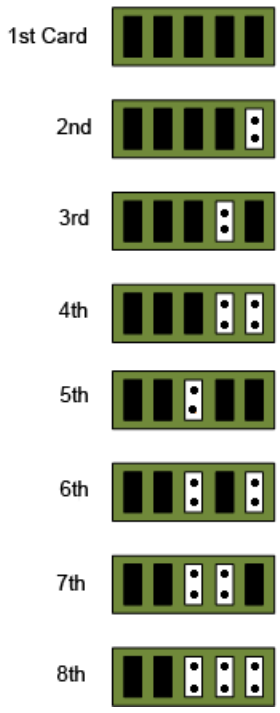
Connect SD inputs using the 16-way splitter cable (provided). The splitter cable consists of 16 BNC sockets numbered 1-16, connected to a 26-way D connector. To connect a video input, connect the Composite/S-Video Luma and Chroma as indicated in the table below.

| Input | Composite/S-Video Luma = BNC Connector | Chroma = BNC Connector |
|---|---|---|
| 1 | 1 | 9 |
| 2 | 2 | 10 |
| 3 | 3 | 11 |
| 4 | 4 | 12 |

## Installing Multiple Cards

Up to 8 cards can be installed in a system providing a maximum of 32 SD capture channels and 8 DVI-I capture channels.

In order to control the order in which the driver uses the cards, it is recommended when installing multiple cards that the J6 links on the XtremeRGB-Ex4+ are configured. Each card should be configured as follows:




### DirectShow

If you change the link ordering after installation you must run dplinks.exe. This program will update the existing input names used by the windows DirectShow interface.

To run the dplinks program open the **Run** by clicking on **Start/Run** and type `dplinks` and then press Enter.

The program will run, however no notifications are displayed.

## Firmware Upgrades

The XtremeRGB-Ex4+ card allows firmware upgrades to be completed on site rather than returning the card to EMS. Whenever a firmware upgrade is performed, **LK1 MUST BE FITTED on the XtremeRGB-Ex4+.** To perform the upgrade, follow the step-by-step instructions provided by the upgrade application.

In the unlikely event that something goes wrong during the upgrade process (e.g. System power outage) it is possible to revert to the factory settings by powering down the system, temporarily removing LK1 then powering up the system with the link removed. Once the system has rebooted, replace the LK1 link (whilst the system is powered up) and restart the firmware upgrade process.

It should be noted that the driver installation program includes an automatic firmware update, if required. Therefore, prior to installing the application and driver, ensure that LK1 is fitted.

## Extended Display Identification Data (EDID) - Disable Links

EDID is data provided by a display monitor and sent to the graphics device detailing monitors capabilities thereby enabling a system to identify the type of monitor that is attached.

The graphics device installed on your machine will see the card as a monitor and will expect to receive the EDID data from the card.

However, in rare circumstances it may be necessary that the XtremeRGB-Ex4+ does not report an EDID of any kind. In this instance EDID support can be disabled by removing links LK3.

Removing the LK3 link on the XtremeRGB-Ex4+card will disable the EDID function on the DVI/RGB channel.

## Software Installation

The XtremeRGB-Ex4+ software (driver and application) is installed by inserting the CD that was shipped with your card into your CD ROM drive. The installation process should start automatically.

Should the CD fail to autorun use **Explorer** to browse the CD, locate then double click on **install.exe** file e.g. **d:/install.exe** and click on **Install Software…** and follow the installation wizard instructions as prompted.

Regular software updates are available from our website: www.ems-imaging.com

Also available on the EMS CD:

- The Release Notes - The release notes contain the latest information on the XtremeRGB-Ex1 including:
- Installation instructions.
- Release history
- Known problems
- Troubleshooting
- The application Help File - Instructions on how to use the application. The help file is in **cd:/XtremeRGB Manual/XtremeRGB_help.pdf**
- Test patterns to assist in setting up an analog RGB / DVI source (see help file topic *How to set up an* RGB / DVI *Source*)

## Application Overview

The application displays the video source in a window; it has the following features:

- Scales the video data to fit in the window
- Save a single frame to a file in one of the following formats:
  BMP, JPEG, GIF, TIFF, PNG
- Print a single frame
- Record and playback captured data using DirectShow
- Maintain the aspect ratio of the displayed video data
- Cropping
- Display text over the video data (on-screen display)
- Command line interface
- Help file documenting all features

**Note:**

**The supplied drivers and software require that you are using:**

- **Windows® XP PRO/Server 2003/Server 2008 or Vista**
- **CD / DVD ROM Drive**

## Using the card with other EMS products

The XtremeRGB-Ex4+ captures video data and stores it in an on-board video buffer. This data is then copied using bus master DMA to the host system for display, storage or streaming.

When a EMS graphics card is used, the XtremeRGB-Ex4+ transfers the data directly to the graphics card thereby increasing performance. The XtremeRGB-Ex4+ sends the relevant portions of each captured image to each display channel and instructs each channel to use its graphics engine to render the data. This fully utilises the hardware and dramatically increases performance.

When a Direct3D compatible graphics card is used the data can be transferred direct to the graphics card in a similar manner to the EMS graphics card with the added benefit of non-tearing captures.

When the video data is displayed on a non EMS graphics card, the XtremeRGB-Ex4+ sends the data to system memory or direct to the graphics card, dependant on the software used for display.

# Chapter 8

# EMS Limited

EMS has a long and very successful history in the computer graphics industry. EMS has been designing and supplying high performance, high quality graphics display systems to the world's largest and most demanding companies and institutions since 1982. EMS was one of the founding companies of multi-screen Windows acceleration using single and multi board solutions. Now using the very latest display technology EMS offers some of the world's leading multi screen graphics accelerators for the most demanding applications.

As new technology advances, so we at EMS improve the performance and functionality of both our hardware and software to give our customers more. Following a continuous development program, we pride ourselves on our support and responsive nature towards all our customers and their changing needs. As more sophisticated equipment and techniques become readily available, so we are there to exploit the power and potential that this technology presents.

## Technical Support

Users can access our technical support line using, email, and the Support page on the EMS Website, usually with a response within 24 hours (excluding weekends).

www.ems-imaging.com

Via Email:

Send an email to support@ems-imaging.com with as much information about your system as possible. To enable a swift response we need to know the following details:

- Specification of the PC - including processor speed
- Operating System
- Application Software
- EMS Hardware / Software
- The exact nature of the problem - and please be as specific as possible

Please quote version and revision numbers of hardware and software in use wherever possible.

Copyright Statement

© EMS Ltd., England, 2009

EMS Limited claims copyright on this documentation. No part of this documentation may be reproduced, released, disclosed, stored in any electronic format, or used in whole or in part for any purpose other than stated herein without the express permission of EMS Limited.

Whilst every effort is made to ensure that the information contained in this User Manual is correct, EMS Limited make no representations or warranties with respect to the contents thereof, and do not accept liability for any errors or omissions. EMS reserves the right to change specification without prior notice and cannot assume responsibility for the use made of the information supplied. All registered trademarks used within this documentation are acknowledged by EMS Limited.

## UK Headquarters and Main Sales Office

Electronic Modular Solutions Limited
Kendal House, 20 Blaby Road
S. Wigston, Leics., LE18 4SB, England
Tel: +44 (0) 116 2775730
Fax: +44 (0) 116 2774973
Email: sales@ems-imaging.com
Web: www.ems-imaging.com

# Chapter 9

## Index


BMP, 13, 21, 30, 38, 49
Board Format, 25, 35, 43
Channel 1, 19, 27
Channel 2, 19, 27
Connectors, 25, 35, 43
EMS, 50
DMA, 13, 21, 31, 39, 49
drivers, 13, 21, 30, 38, 49
DVI Mode Support, 8, 17, 25
DVI to VGA adapters, 10, 19, 27, 45
DVI to VGA Adapters, 9
DVI-I type connectors, 19, 27, 36, 45
EDID, 12, 20, 29, 48
Firmware Upgrade, 12, 20, 29, 38, 48
French Office, 51
GIF, 13, 21, 30, 38, 49
Hardware Overview, 34
Help File, 12, 20, 30, 38, 48
Input Mode Detection, 8, 17, 25, 35
Install Software, 12, 20, 30, 38, 48
Installation instructions, 12, 20, 30, 38, 48
Installing, 10, 18, 27, 36, 45
J5 links, 11, 19, 37, 47
J6 Links, 28
JPEG, 13, 21, 30, 38, 49
LK2 link, 20, 29, 48
LK4, 12, 38, 48
Main Sales Office, 51
Maximum Sample Rate, 8, 17, 25, 35, 43
Media Encoder, 4, 34, 42
Media Player, 4, 34, 42
Models, 7, 16, 24, 34
Operating System Support, 8, 17, 25, 35, 43
Operating Temperature, 8, 17, 25, 35
packing box, 9, 18, 26, 35, 44
PCI slot, 10, 18, 27, 36, 45
Pixel Display Formats, 8, 17, 25, 43
PNG, 13, 21, 30, 38, 49
Relative Humidity, 8, 17, 25, 35
Release Notes, 12, 20, 30, 38, 48
RGB Mode Support, 8, 17, 25, 43
SDK, 4
software, 12, 20, 30, 38, 48
Specification, 8, 17, 25, 35
Storage Temperature, 8, 17, 25, 35
technical support, 50
Test patterns, 12, 20, 30, 48
TIFF, 13, 21, 30, 38, 49
UK Headquarters, 51
Update Rate, 8, 17, 25, 43

Video Capture Memory, 8, 17, 25, 35, 43
Video Format, 8, 17, 25, 43
Video Sampling, 8, 17, 25, 43
XtremeRGB-Ex4+, 49